



Volunteer Lake Assessment Program Individual Lake Reports

MASSASECUM, LAKE, BRADFORD, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	6,044	Max. Depth (m):	16.4	Flushing Rate (yr ⁻¹)	2	Year	Trophic class	KNOWN EXOTIC SPECIES
Surface Area (Ac.):	402	Mean Depth (m):	3.8	P Retention Coef:	0.59	1987	MESOTROPHIC	Variable Milfoil
Shore Length (m):	6,400	Volume (m ³):	6,229,000	Elevation (ft):	631	2005	MESOTROPHIC	

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

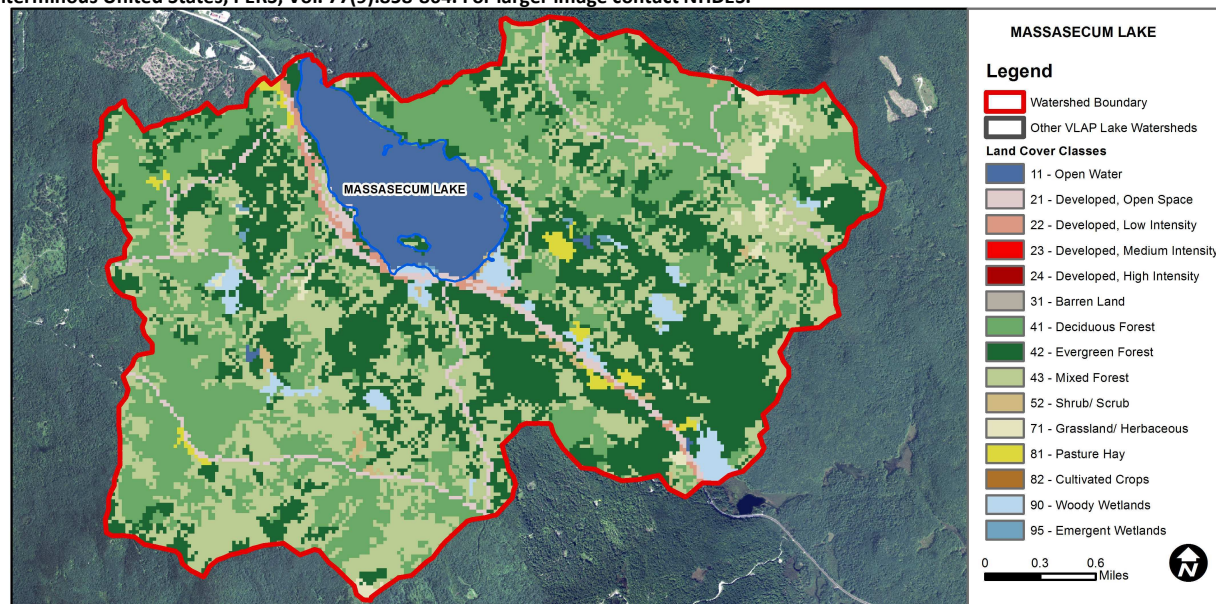
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen saturation	Good	There are at least 10 samples with one, but < 10% of samples, exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

LAKE MASSASECUM - CAMP PIESAULE BEACH	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
LAKE MASSASECUM - FRENCH'S PARK TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.
LAKE MASSASECUM - MASSASECUM CASINO BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	7.14	Barren Land	0	Grassland/Herbaceous	1.22
Developed-Open Space	3.22	Deciduous Forest	27.57	Pasture Hay	0.81
Developed-Low Intensity	0.67	Evergreen Forest	28.23	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	28.68	Woody Wetlands	1.96
Developed-High Intensity	0	Shrub-Scrub	0.43	Emergent Wetlands	0.13



VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS

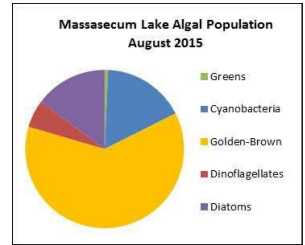
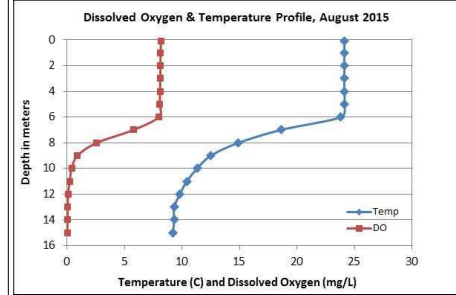
MASSASECUM LAKE, BRADFORD

2015 DATA SUMMARY

RECOMMENDED ACTIONS: Do not collect tributary samples if the flow is too low or stagnant to collect samples free of sediment and organic matter. The beaver dam at Mountain Inn Brook has likely led to the significant increase in phosphorus. Consider installing a flow through device through the dam to restore water flow to this tributary. Investigate potential sources of elevated phosphorus, conductivity and chloride in Frenches Park and Casino Brooks by conducting bracket and stormwater sampling upstream. Contact the VLAP Coordinator for assistance and to schedule a biologist visit in 2016. Keep up the great work!

OBSERVATIONS (Refer to Table 1 and Historical Deep Spot Data Graphics)

- **CHLOROPHYLL-A:** Chlorophyll levels were low in July and increased slightly in August. The 2015 average chlorophyll level was stable with 2014 and less than the state median. Historical trend analysis indicates stable chlorophyll levels since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Deep spot, Babcock, Colby, Howlett, Melvin, Mountain Inn, and Pierce Rd. Brooks' conductivity levels were within low to average levels and approximately equal to the state median. Casino, Frenches Park, and Davis Brooks' conductivity levels were elevated and chloride levels in Frenches Park Bk. were also slightly elevated and greater than the state medians. Historical trend analysis indicates highly variable epilimnetic (upper water layer) conductivity since monitoring began.
- **E. COLI:** Davis Brook #2 E. coli levels were low in July and elevated above the state standards for surface waters in August following a significant storm event.
- **TOTAL PHOSPHORUS:** Epilimnetic phosphorus remained low and was much less than the state median. Historical trend analysis indicates highly variable epilimnetic phosphorus since monitoring began. Metalimnetic (middle water layer) phosphorus was low in July and increased to average levels in August, and hypolimnetic (lower water layer) phosphorus remained within an average range. Babcock, Colby, Davis, Melvin, and Pierce Rd. Brooks' phosphorus levels were within average ranges for those stations. Casino, Frenches Park, Howlett, and Mountain Inn Brooks' phosphorus levels were elevated in July and the turbidity of the samples was also elevated. Laboratory data note sediment in all samples which likely contributed to the phosphorus. Howlett Bk. phosphorus decreased to average levels in August. Frenches Park phosphorus remained elevated in August following a significant storm event. Casino Bk. phosphorus also remained elevated in August and low flow conditions were noted. Mountain Inn Bk. phosphorus remained elevated as well and a beaver dam upstream of this station was noted.
- **TRANSPARENCY:** Transparency was high (good) and remained stable from July to August. Average transparency decreased slightly from 2014 but was much better than the state median. Historical trend analysis indicates stable transparency since monitoring began.
- **TURBIDITY:** Deep spot, Babcock, Davis, Melvin, and Pierce Rd. Brooks' turbidities were within low to average ranges for those stations. Casino, Colby, Frenches Park, Howlett, and Mt. Inn Brook's turbidities were generally elevated in July and August. Low flow and stagnant conditions led to sediment contamination in July samples. August samples were collected following a significant storm event after a period of dry weather and stagnant conditions.
- **pH:** Deep spot pH was generally less than the desirable range 6.5-8.0 units and historical trend analysis indicates significantly decreasing (worsening) epilimnetic pH since monitoring began.



NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.

Chloride: > 230 mg/L (chronic)

E. coli: > 88 cts/100 mL – public beach

E. coli: > 406 cts/100 mL – surface waters

Turbidity: > 10 NTU above natural level

pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.

Alkalinity: 4.9 mg/L

Chlorophyll-a: 4.58 mg/m³

Conductivity: 40.0 uS/cm

Chloride: 4 mg/L

Total Phosphorus: 12 ug/L

Transparency: 3.2 m

pH: 6.6

Station Name	Table 1. 2015 Average Water Quality Data for MASSASECUM LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	4.8	2.94		39.9		6	5.00	5.79	0.87	6.51
Metalimnion				38.6		11			1.25	6.07
Hypolimnion				38.0		14			3.19	5.82
Babcock Brook				49.3		14			1.30	6.35
Casino Brook				230.5		37			15.47	5.80
Colby Brook				30.7		15			2.56	6.77
Davis Brook				106.1		20			1.93	5.89
Davis Brook #2					285					
Frenches Park Brook			38	181.0		34			5.71	6.76
Howlett Brook				44.4		58			8.19	6.65
Melvin Bk Outlet				43.2		8			0.97	6.36
Mountain Inn Brook				43.4		114			12.10	6.18
Pierce Rd Brook				62.5		14			1.21	6.98

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Stable	Trend not significant; data highly variable.	Chlorophyll-a	Stable	Trend not significant; data show low variability.
pH (epilimnion)	Worsening	Data significantly decreasing.	Transparency	Stable	Trend not significant; data show low variability.
			Phosphorus (epilimnion)	Stable	Trend not significant; data highly variable.

